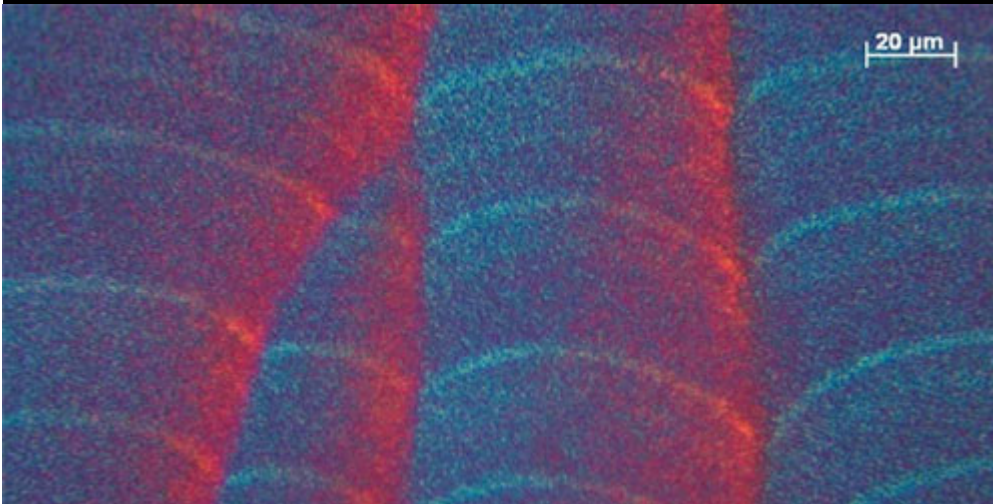




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[Home](#) > [Research](#) > Carbon Materials

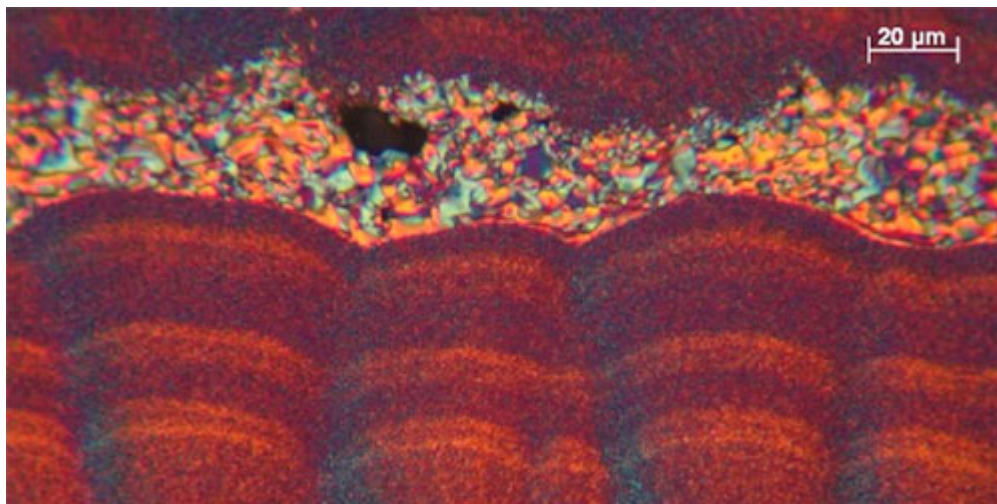
## Carbon Materials



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Carbon materials touch every aspect of our daily life in some way. Activated carbons are used for water and air purification, carbon black is used to reinforce tires, carbon fiber composites are used to manufacture ultra-light graphite sporting goods and aircraft brakes, carbon foams are used to make fire retardant insulation, and petroleum coke is used to manufacture graphite electrodes for recycling iron and steel.

The use of carbon materials for a multitude of applications derives from the materials' unique diversity of structures and properties that extend from chemical bonding between carbon atoms to nanostructures, crystallite alignment, and microstructures. Penn State has a rich 62-year history in carbon materials research. The EMS Energy Institute's Carbon Materials Program focuses its research on materials such as graphite, petroleum and metallurgical coke, activated carbon, anthracite, and pitch.

## Research

- Chemistry of mesophase development during delayed coking of FCC Decant Oil
- Characterization of pre-baked carbon anodes using microscopy and temperature-programmed oxidation
- Effects of inorganic impurities on graphite oxidation
- Catalytic oxidation of carbon/carbon composite materials
- Characterization of optical textures of cokes and carbons
- Characterization of chars from coal conversion processes
- Coking of injectors and fuel lines in internal combustion engines
- Molecular modeling of coal and carbonaceous materials
- Modification of surface chemistry of carbon materials to optimize adsorption
- Use of specialty carbon materials as catalyst supports and adsorbents
- Specialty carbons from polymers

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